

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* TAKAAKI HIRAI,  
MINORU FUJISHIMA,  
HIROYUKI UENI,  
HIDEYASU MATSUMURA,  
IKUO MORIOKA, and  
SHINPEI NAKAYAMA

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Appeal 2006-1999  
Application 09/856,468  
Technology Center 1700

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Decided: September 8, 2006

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Before PAK, TIMM, and FRANKLIN, *Administrative Patent Judges*.  
FRANKLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1, 3-8, and 10-20.

A copy of claim 1, which is representative of the subject matter on appeal, is set forth below:

1. Pre-expanded foam particles formed from a moldable crystalline aromatic polyester resin, said particles having a bulk density in the range of from 0.01 to 1.0 g/cm<sup>3</sup>, crystallinity in the range of from 1 to 8% and a crystallization peak temperature in the range of from 130 to 180°C, wherein the resin contains at least one moiety of a moiety derived from isophthalic acid or a moiety derived from 1,4-cyclohexanedimethanol in a total amount ranging from 0.5 to 10% by weight of the crystalline aromatic polyester resin.

Claims 1, 3-8, and 10-20 stand rejected under 35 U.S.C. § 103 as being obvious over Niido in view of Park.

The Examiner relies upon the following references as evidence of unpatentability:

Park	US 5,475,037	Dec. 12, 1995
Niido (as translated)	JP 8-174,590	Jul. 9, 1996

We use the English translation provided by The McElroy Translation Company for the reference of Niido.

We note that Appellants filed an Appeal Brief on November 4, 2004, a Reply Brief on March 11, 2005, and a second Reply Brief filed on December 9, 2005. We have considered each of these papers in making our determinations herein. The Examiner filed an Examiner's Answer on January 12, 2005, and also filed a second Examiner's Answer on October 11, 2005. We have reviewed each of these Answers. In this decision, when we

refer to the Answer, it is the Answer that was mailed on October 11, 2005, unless otherwise indicated.

To the extent that the commonly rejected claims have been separately argued, they will be individually considered in our assessment of the respective rejections advanced on this appeal. *See In re Dance*, 160 F.3d 1339, 1340 n.2, 48 USPQ 1635, 1636 n.2. (Fed. Cir. 1998). Also see 37 C.F.R. § 41.37(c)(1) (vii)(Sept. 2004).

#### OPINION

##### I. The 35 U.S.C. § 103 Rejection of Claims 1, 3-8, and 10-20

The Examiner's position for this rejection is set forth on pages 3-9 of the Answer. Rather than reiterate the Examiner's position herein, we simply cite to the relevant portion of the Answer, and add the following for emphasis.

A comparison of the elements as set forth in Appellants' claim 1 with the disclosure of Niido is set forth below.

Appellants' claim 1	Niido
Pre-expanded foam particles formed from a resin	Pre-expanded foam particles formed from a resin
Bulk density 0.01 to 1.0 g/cm <sup>3</sup>	0.2 g/cm <sup>3</sup> See paragraph 18, p. 9
Crystallinity 1 to 8%	Less than 25%, preferably less than 20%, most preferably less than 15%. See paragraph 8, p. 5. Also see the Example 7, having 10%, in paragraph 18, p. 9
Crystallization peak temperature 130 - 180°C.	Silent
The resin contains at least one moiety of a moiety derived from isophthalic acid or a moiety derived from 1,4-cyclohexanedimethanol, in a total amount ranging from 0.5 to 10% by weight of the crystalline aromatic polyester	Silent

As shown in the above comparison, Niido is silent with respect to two aspects of Appellants' claim 1. The Examiner recognizes this as indicated in the paragraph bridging pages 4-5 of the Answer. The Examiner states that Niido is silent about the crystallization peak temperature. The Examiner also states that Niido is silent about the exact composition of the polyester resin (Answer, 4-5).

The Examiner explains, however, that Niido does teach that suitable polyester resins are obtained by the reaction of dihydric alcohol in a dicarboxylic acid. The Examiner refers to paragraph 15 on page 8 in the English translation of Niido in this regard. The Examiner explains that

Niido also teaches, in paragraph 15, that cyclohexanedimethanol can be used as the dihydric alcohol (Answer, 5).

The Examiner then refers to the reference of Park. The Examiner finds that Park teaches that generally the amorphous polyester resins may be produced by introducing irregularity in the polymer chains. Such irregularity may be introduced in the molecular chains by utilizing and effecting polymerization in the presence of a plurality of diacids, diols, or both, such as isophthalic acids, cyclohexanedimethanol, or mixtures of both (Answer 5).

The Examiner states that Park teaches that amorphous polyesters are produced by the incorporation of relatively large amounts (about 15% to about 50%) of isophthalic acid or cyclohexanedimethanol or both in the polymeric structure, and refers to column 2, line 5- through column 3, line 16 of Park. Based upon this teaching, the Examiner states that Park implicitly teaches that when the amount of comonomers is less than 15% the crystallinity of PET is reduced, but not to the degree of being considered as amorphous (Answer, 5-6).

Hence, the Examiner concludes therefore that it would have obvious to have selected a polyester resin having a reduced crystallization rate formed by incorporating a suitable small amount (less than 15%) of isophthalic acid and/or cyclohexanedimethanol comonomers, as implicitly taught by Park, motivated by the desired to obtain a pre-expanded foam particle with a reduced crystallinity of less than 25% as taught by Niido, motivated by the desire to obtain improved fusion between particles for a strongly foamed molded body. See the paragraph bridging pages 5-6 of Answer.

With regard to the crystallization peak temperature, the Examiner's position is that because the combined teachings of Niido and Park read on the composition of the aromatic polyester resin as claimed, the claimed crystallization peak temperature is either anticipated or obviously provided by such a composition (Answer 6). In support of this logic, the Examiner refers to Appellants' admission in the Brief at the top of page 11 wherein Appellants state that "[t]he crystallization peak temperatures is a function of the materials."

Beginning on page 6 of the Brief, Appellants argue that Niido does not disclose, teach, or suggest a crystallinity lower than 8.5%. We disagree. Niido clearly teaches a range of crystallinity in paragraph 8 on page 5 of the English translation of Niido. Niido teaches most preferably the amount is less than 15%, which is inclusive of Appellants' claimed amount of from 1 to 8%.

With regard to the amount of isophthalic acid or 1,4-cyclohexanedimethanol in the resin, Appellants recognize that Park teaches isophthalic acid as a comonomer in a concentration of from 15 to 50%, and refers to column 3, lines 15-16 in this regard. According to the Examiner's rationale, because Park teaches greater than 15% comonomer is required to impart an amorphous property, Park implicitly teaches that when the amount of the comonomer is less than 15%, the crystallinity of the PET is reduced but not to the degree of being considered as amorphous.

We are not convinced by Appellants' arguments that the Examiner's findings are incorrect. For example, we refer to Appellants' Reply Brief filed on March 11, 2005. Appellants argue that the teaching in Park does not read on the claim limitations. Appellants argue that Park only teaches an

amorphous polyester resin obtained from the copolymerization with 15 to 50% of cyclohexanedimethanol and/or isophthalic acid. Appellants also argue that Park teaches away from the use of crystalline polyester.

Appellants argue that Park does not expressly or inherently teach crystalline polyester resin obtained from the copolymerization with 0.5 to 10% of cyclohexanedimethanol and/or isophthalic acid. Yet Appellants do not dispute the Examiner's logic as mentioned above (that an amount less than 15% points toward polyester resin that is not amorphous). Appellants merely argue that such an interpretation does not outweigh the express teachings in Park to use only an amorphous, and not a crystalline, polyester resin. See paragraph 2 on page 2 of the Reply Brief.

We emphasize that the Examiner relies upon Niido for use of a crystalline polyester resin. The Examiner relies upon Park for teaching the aspect of the amount of isophthalic acid or 1,4-cyclohexane-dimethanol which would suggest formation of a crystalline polyester resin. Park explains how the amount of copolymers affects amorphous or crystalline polyester resins. *In re Sasse*, 629 F.2d 675, 681, 207 USPQ 107, 111 (CCPA 1980).

On page 3 of the Reply Brief filed on March 11, 2005, Appellants argue that even when assuming that Park implicitly teaches the reduced crystallinity of PET when the amount of comonomers is less than 15%, Park does not teach or suggest a claimed range of 0.5 to 10% by weight. Again, the amount of less than 15% would suggest the claimed range of 0.5 to 10%.

In view of the above, we agree with the Examiner's conclusion that the combination of Niido in view of Park suggests Appellants' claimed subject matter.

Appellants provide rebuttal evidence in the form of a Declaration under 37 C.F.R. § 1.132 filed on June 21, 2004 and an English translation of "The Experiment Report", which was attached to the Declaration. Appellants discuss these items on pages 7-8 of their Brief. Appellants also discuss Tables 5 to 7 and comparative Example 4, found in their specification (Br. 9 and Reply Br. 3).<sup>1</sup>

In general, an applicant may overcome a prima facie case of obviousness by establishing "that the [claimed] range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range". *In re Geisler*, 116 F.3d at 1469-70, 43 USPQ2d at 1365 (alteration in original)(quoting *In re Woodruff*, 919 F.2d at 1578, 16 USPQ2d 1936).

Also, an appellants' showing of unexpected results must be commensurate in scope with the claimed range. *See In re Greenfield*, 571 F.2d 1185, 1189, 197 USPQ 227, 230 (CCPA 1978)("Establishing that one (or a small number of) species give unexpected results is inadequate proof, for 'it is the view of this court that objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.'" (quoting *In re Tiffin*, 448 F.2d 791, 792, 171 USPQ 294, 294 (CCPA 1971))).

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<sup>1</sup> In the second Reply Brief filed by Appellants on December 9, 2005, Appellants argue that the Examiner's Answer dated October 11, 2005 did not discuss the rebuttal evidence. However, we note that in the Examiner's Answer mailed January 12, 2005, the Examiner addressed the 37 C.F.R. § 1.132 Declaration in the paragraph bridging pages 9-10 of the Answer. The Experiment Report was attached to this Declaration. We provide the following comments with regard to rebuttal evidence.



Finally, rebuttal evidence can be in the form of direct or indirect comparative testing between the claimed invention and the closest prior art. *In re Merchant*, 575 F.2d 865, 869, 197 USPQ 785, 788 (CCPA 1978); *In re Blondel*, 499 F.2d 1311, 1317, 182 USPQ 294, 298 (CCPA 1974); *In re Swentzel*, 219 F.2d 216, 220, 104 USPQ 343, 346 (1955).

We determine that Appellants' rebuttal evidence is insufficient to overcome the prima facie case of obviousness for the following reasons.

Upon review of the table on the last page of The Experiment Report, we cannot see how representative Examples 1 and 3 (representative of Appellants' invention) are commensurate in scope with Appellants' claim. For example, Experiment 1 contains an amount of IPA of 1.7% and Experiment 3 contains an amount of IPA of 7.3%. Appellants' claim 1 recites a range from 0.5 to 10%. The two data points are not representative of the entire claimed range.

With regard to the statements made in the Declaration by Takaaki Hirai, as discussed by the Examiner in the paragraph bridging pages 9-10 of the Answer mailed January 12, 2005, the statement made that none of the applied references suggests pre-expanded particles having a crystallinity in the range of 1-8% is unconvincing because Niido clearly suggests a crystallinity of 25% or less with a preference for 15% or less.

With regard to Appellants' discussions that page 12, lines 8-16 of the specification suggests that the criticality of the claim parameters is evidence of nonobviousness, we provide the following.

Appellants argue on page 9 that the present specification teaches that the intended product produced by the present invention cannot be produced when the ranges of the IPA or the CHDM are outside of the claimed range.

Appellants argue that this statement is evidence establishing criticality of the claimed range, and is sufficient to satisfy any obviousness rejection. We note that it is well settled that unexpected results must be established by factual evidence.<sup>2</sup> “Mere argument or conclusory statements in the specification does not suffice.” *In re DeBlauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1994); *see also In re Geisler*, 116 F.3d 1465, 1467, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997).

Appellants do refer to experimental evidence in Tables 5-7 on pages 72-74 of the specification and comparative Example 4. Upon review of tables 5-7, we observe that the examples representative of Appellants' invention (Examples 5, 6, 7, 8, 9, 10, and 11) range from 0.6 to as high as 8.6. This does not fully reflect the claimed range of 0.5 to 10%. Also, from a crystallinity percentage, referring to Table 6 on page 73, the examples representative of Appellants' invention range from 1.0 to 4.8. This does not reflect the claimed range of 1-8%. Also, with regard to the crystallization peak temperature, the values in Table 6 are as low as 135°C, to as high as 151.2°C, which does not fully reflect the claimed range of 130°C to 180°C.

In view of the above, we therefore are not convinced by Appellants' rebuttal evidence. We therefore affirm the obviousness rejection.

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<sup>2</sup> To the extent that the Appellants' arguments are directed non-enablement of the applied prior art references in terms of producing the claimed product, we note that the Appellants have not proffered sufficient factual evidence to show that a person having ordinary skill in the art having knowledge of the cited prior art references and the state of the art would not have been able to produce the claimed product. *Sasse*, 629 F.2d at 681, 207 USPQ at 111.

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## II. CONCLUSION

The rejection of claims 1, 3-8, and 10-20 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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